

**IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF CALIFORNIA  
SAN JOSE DIVISION**

**CONFIDENTIAL – TO BE FILED UNDER SEAL  
SUBJECT TO PROTECTIVE ORDER**

**IN RE: HIGH-TECH EMPLOYEES ANTITRUST  
LITIGATION**

**No. 11-CV-2509-LHK**

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**THIS DOCUMENT RELATES TO:**

**ALL ACTIONS**

**EXPERT REPORT OF EDWARD E. LEAMER, PH.D.**

**October 28, 2013**

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**I. Introduction, Assignment, and Summary of Conclusions**

1. I have been asked by counsel for the Plaintiffs in this case to analyze the impact on members of the Class<sup>1</sup> of the Defendants' conspiracy to restrain competition for each others' employees, which they accomplished through a set of Non-Compete Agreements. I have addressed this question in four prior reports dated October 1, 2012 (the "Leamer Report"); December 10, 2012 (the "Leamer Reply Report"); May 10, 2013 (the "Leamer Amended Report"); and July 12, 2013 (the "Leamer Amended Report"). In those prior reports I explained how and why the agreements impacted the compensation of the Defendants' workforces, including members of the Class. I stand by the opinions and analyses stated in those reports, which I attach to this report as Exhibits A - D and incorporate by reference herein. I reserve the right to testify at trial (if asked) to any and all of the opinions and other matters discussed in my prior reports or in my depositions in this case.
2. In my first report of October 1, 2012, I described a methodology (regression analysis) for showing impact and calculating damages to the Defendants' workforces as a whole and demonstrated how it could work.<sup>2</sup> In this report, I present my revised analysis of Class undercompensation and damages arising from the Non-Compete Agreements. The revision is made necessary by some small changes to the list of titles in the Class, revisions to some of the data series including revenues from Lucasfilm and Pixar, and some minor changes in the model that allow more reliable damage estimates. I also address some questions raised by counsel for the Defendants as possible criticisms of this work, such as

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<sup>1</sup> I understand that the Class includes: "All natural persons who work in the technical, creative, and/or research and development fields that are employed on a salaried basis in the United States by one or more of the following: (a) Apple from March 2005 through December 2009; (b) Adobe from May 2005 through December 2009; (c) Google from March 2005 through December 2009; (d) Intel from March 2005 through December 2009; (e) Intuit from June 2007 through December 2009; (f) Lucasfilm from January 2005 through December 2009; or (g) Pixar from January 2005 through December 2009. Excluded from the Class are: retail employees; corporate officers, members of the boards of directors, and senior executives of all Defendants." Order Granting Plaintiffs' Supplemental Motion for Class Certification, October 24, 2013.

<sup>2</sup> Expert Report of Edward E. Leamer, October 1, 2012, pp. 62-70.

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supposed peculiarities of Intel's workforce,<sup>3</sup> and show that these features either do not exist or have no meaningful impact on the analysis.

3. The materials I relied upon in the preparation of this report are listed in Exhibit 1 as well as the exhibits to my previous reports (Exhibits A - D). I reserve the right to consider any further relevant evidence that might emerge and to revise my opinions if needed.

## II. Background

### A. Defendants and the Alleged Agreements

4. In my previous Reports I described my understanding of the alleged Non-Compete Agreements. Based on my review of the evidence in this case and on the Plaintiffs' Supplemental Answers and Objections to Defendants' Second Set of Interrogatories, I understand that the time periods during which Defendants are believed to have participated in Non-Compete Agreements are as follows:<sup>4,5</sup>

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<sup>3</sup> Deposition of Edward E. Leamer, June 11, 2013 at pp. 817.

<sup>4</sup> See ADOBE\_001096-097 and 231APPLE002145 (Adobe-Apple); PIX00003419 (Apple-Pixar); 231APPLE002140 and 231APPLE073139 (Apple-Google); GOOG-HIGH TECH-00008281-284 (Google-Intel); GOOG-HIGH TECH-00008342-350 (Google-Intuit); and Deposition of James Morris, August 3, 2012 at p. 93 (Lucasfilm-Pixar). Although there is evidence that the Non-Compete Agreement between Pixar and Apple dates from prior to 2005, the start date cannot be given with certainty due to a lack of evidence. I have therefore conservatively assumed, solely for purposes of computing damages, that Apple did not join the conspiracy until 2005.

<sup>5</sup> These dates are based on the earliest notice sent to a party to the alleged agreement. I understand that Apple and Google each received a Civil Investigative Demand ("CID") on March 13, 2009. I have made a conservative assumption, which is that the Defendants immediately ceased their illegal activity upon receipt of a CID.

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**Figure 1: Periods of Participation in Alleged Collusive Agreements**

<u>Defendants</u>	<u>Start Date</u>	<u>End Date</u>
(1)	(2)	(3)
Adobe	May 2005	March 2009
Apple	February 2005	March 2009
Google	February 2005	March 2009
Intel	March 2005	March 2009
Intuit	June 2007	March 2009
Lucasfilm	Mid-1980s	March 2009
Pixar	Mid-1980s	March 2009

5. All of the Non-Compete Agreements covered all employees of the respective companies, regardless of employee geography, job function, product group, or time period. Each of the Agreements prohibited cold-calling, meaning that the parties agreed not to solicit each other's employees in any manner. The agreements applied to all recruiters who were either directly employed by or were headhunters hired by the agreeing firms.<sup>6</sup> Some of the agreements included additional terms, such as:

- Do not hire: The parties agreed not to make employment offers to employees of the other firm without specific approval from the current employer's chief executive.<sup>7</sup>
- Pre-notify: The parties agreed to notify each other prior to making an offer to hire an employee at the other firm.<sup>8</sup>

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<sup>6</sup> See e.g., 231APPLE001164, GOOG-HIGH TECH-00023500-601 at 520-528, and PIX00000400.

<sup>7</sup> When present, this provision applied even when an employee initiated contact. Even if certain agreements may not have begun with this express provision, they often operated in this manner in practice. For example, Pixar and Google sought Steve Jobs' permission before making offers to Apple employees. See PIX00006025; 231APPLE002151. Apple refused to consider Adobe employees unless they first left employment with Adobe. See 231APPLE080776 [REDACTED]

[REDACTED] Apple also attempted to enter into a "no hire" agreement with Palm, which Palm's CEO, Ed Colligan, rejected. See PALM00005 – 008 at 006 and PALM00022 – 027 at 024. See also, 231APPLE002153 - 154, and 231APPLE002214.

<sup>8</sup> See e.g., PIX00000400; GOOG-HIGH TECH-00056790.

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- No counteroffer: The initiating firm that makes an offer to an employee of the other firm agreed not to improve its initial offer if the offer was matched by the other firm.<sup>9</sup> In other words, “no bidding wars.”<sup>10</sup>
6. I understand that by the end of March 2009, the Department of Justice (“DOJ”) had informed certain defendants of the investigation. On June 3, 2009, the New York Times published an article indicating that the DOJ had begun an investigation into the Defendants’ hiring practices and the alleged Non-Compete Agreements in particular.<sup>11</sup> I have assumed that the agreements between the defendants ceased to have an effect on their recruiting and hiring activities in March 2009.

#### **B. Plaintiffs and Class Members**

7. The members of the Class each worked for a Defendant at a time when that Defendant was a party to at least one such Agreement (excluding retail employees, corporate officers, members of the boards of directors, and senior executives). I summarize the total employment and compensation of these workers in Figure 2 below.

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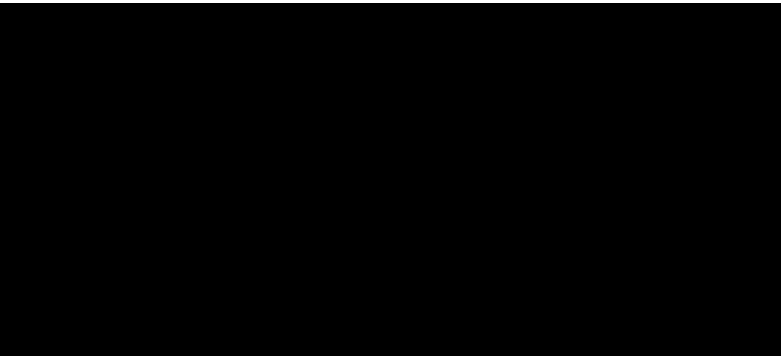
<sup>9</sup> See PIX00000400; LUCAS00009252.

<sup>10</sup> See PIX00004051 [REDACTED]

<sup>11</sup> Helft, Miguel, “Unwritten Code Rules Silicon Valley Hiring,” The New York Times, June 3, 2009, [http://www.nytimes.com/2009/06/04/technology/companies/04trust.html?\\_r=1](http://www.nytimes.com/2009/06/04/technology/companies/04trust.html?_r=1).

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**Figure 2: Class Summary**

<b>Defendant</b>	<b>Class Period</b>	<b>Number of Class Members</b>	<b>Class Employee Years</b>	<b>Total Class Compensation</b>
(1)	(2)	(3)	(4)	(5) (Dollars)
Adobe	05/05-12/09			
Apple	03/05-12/09			
Google	03/05-12/09			
Intel	03/05-12/09			
Intuit	06/07-12/09			
Lucasfilm <sup>1</sup>	01/05-12/09			
Pixar	01/05-12/09			
<b>TOTAL</b>				

<sup>1</sup>Missing job title information prior to 2005.

Source: Defendants' employee compensation data; SEC filings.

### III. Recapitulation of the Relevant Economic Frameworks

8. The Defendants viewed cold-calling as an important means of competing for workers. Cold-calling of workers is a pro-active approach that reaches out to employees who might not respond to other forms of recruiting.<sup>12</sup> Although many firms use cold calling to recruit workers, firms do not appreciate the disruption when other firms cold-call their employees. One way to minimize the disruptive effect of cold calls from other firms is through anticipatory increases in compensation that reduce or eliminate the attractiveness of any future cold calls that might be received. For example, Facebook's active cold-calling of Google's employees in 2010 was countered by Google with an across-the-board increase in compensation, thus illustrating the broad impact cold-calling can have on compensation firm-wide.<sup>13</sup>

<sup>12</sup> For example, ADOBE\_002773-002798 at 785

76566DOC000085-098 at 092.

Also see

<sup>13</sup> See Leamer Report pp.45-47 for a discussion.

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9. Cold-calling is part of the information gathering that reveals the nature of outside opportunities both to workers and to employers. All else being equal, increased information implies increased compensation for Class members, because workers' access to information about better opportunities forces firms to increase compensation both preemptively and reactively. The Defendants suppressed compensation by limiting this flow of information about attractive outside opportunities.
10. I have described in my prior reports economic frameworks relevant to understanding the effect of the alleged non-compete agreements, including: (1) price discovery, (2) internal equity, and (3) profit-sharing.<sup>14</sup>
11. "Price discovery" refers to the process by which a market searches for an equilibrium price when information about supply and demand is imperfect. Members of the Class work in a market characterized by imperfect information and the price discovery framework therefore applies to them. The speed at which price discovery operates depends on the manner in which, and how rapidly, information is disseminated among buyers and sellers. Cold-calling is part of the normal information dissemination process, and non-compete agreements that limit the flow of information about opportunities slow down the price discovery process and thus affect each and every labor contract in a way that works adversely for workers and to the benefit of firms engaged in the Non-Compete Agreements.
12. There can be a normal asymmetry in information that works in favor of employers, since employees may have little or no direct access to the nature of contracts offered and accepted by other similar workers either at their own firm or other firms, and workers may rely mostly on "water-cooler talk" perhaps supplemented by Internet sources. Employers, on the other hand, know exactly the nature of the contracts of every one of their employees, and firms often hire private consulting firms to provide information about outside "market" compensation. Absent cold-calling, many labor contracts are negotiated in unequal bargains between informed employers and uninformed employees.

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<sup>14</sup> Leamer Report pp. 29-33 and Leamer Report pp. 42-44.



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Cold-calling is an important channel of information about outside opportunities that can help employees become better informed and better paid.

13. As I described previously,<sup>15</sup> the information conveyed by a cold call is reinforced by the information provided by other calls, which makes the effect of, e.g., 1000 cold calls greater than 1000 times the effect of a single cold call. This characteristic of information has been called “super-additive” by Dr. Murphy.<sup>16</sup> It is this feature of information that is the reason I have not attempted to trace out the effect of any single cold call but instead have studied the impact of the illegal anti-cold-calling agreements overall.
14. “Internal equity” refers to the tendency of firms to keep compensation packages of different workers roughly in line to minimize the effect on worker morale of adopting a compensation system that subsets of workers feel is “unfair,” which can have an adverse effect on productivity. It is the force of internal equity that can help to spread the impact of the Non-Compete Agreements throughout the Class. As I have explained previously, “equity” does not mean “equal,” i.e. Defendants need not pay all employees the same in order to observe internal equity. Rather, internal equity puts boundaries on the degree to which pay of different employees can diverge, and tends to require maintenance of a somewhat rigid compensation structure. My prior statistical work (carried out in all four prior reports) demonstrates that such structures existed within Defendants’ compensation systems, and my review of the evidence shows that Defendants intentionally maintained them through ordinary features of their pay systems such as salary bands, systematized bonuses and performance reviews, and so forth.<sup>17</sup>
15. “Profit sharing” refers to the sharing of profits from the critical knowledge assets that reside within the minds of technical workers which may largely determine the overall firm success, and the consequent need for firms to find

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<sup>15</sup> Rebuttal Supplemental Expert Report of Edward E. Leamer, Ph.D., July 12, 2013, at pp. 1, 8.

<sup>16</sup> Deposition of Kevin M. Murphy, Ph.D., July 5, 2013, at p. 463.

<sup>17</sup> My review of the evidence includes evidence cited and relied on in drafting my prior reports and also my review of Dr. Hallock’s report, which compiles this evidence.

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some way to assure that they do not lose these critical firm-specific knowledge assets via employee departures. One way to minimize losses from departures is to pay the workers well enough that they are not attracted to outside opportunities, which can mean sharing of the profits of the jointly owned firm-specific assets. Another way is to limit the workers' knowledge of or access to outside opportunities with Non-Compete Agreements, thus keeping more of the profits for the firm's principals and top management.

#### **IV. Damages Estimate**

16. I previously presented a way to estimate damages to the Class in my October 1, 2012 Report, based on individual employee compensation data. I presented an alternative model in my Reply Report based on firm compensation averages, in order to show that the results of the regression are not "sensitive" to criticisms advanced by defense expert Dr. Murphy. These firm-based models also demonstrated how the payroll records of the defendants can be used to estimate the damages caused by the Non-Compete Agreements. However, the form of regression presented in my October 2012 report remains the preferred approach for the reasons explained below. This Report presents a slightly modified and improved model based on changes to the Class and on updated data that were made available since my October 2012 Report. I also discuss some issues I have investigated that seemed potentially important, but turned out to be immaterial.

##### **A. Determinants of Compensation**

17. I have used the standard statistical tool of regression analysis to estimate the impact of the illegal conspiracy on the total compensation of Class members. This approach involves an exploration of the determinants of total compensation at the seven defendant firms between 2001 and 2011, the years for which we have the necessary data.
18. Employee compensation is measured using the Defendants' payroll records. Annual total compensation is the base salary as of December, plus bonuses, the value of stock grants and the estimated value of stock options based on valuations reported by the firms in their SEC filings.

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19. As I described in my initial report, my regression compensation model includes variables that capture five kinds of effects.<sup>18</sup> This framework remains intact.

The categories of variables and corresponding specific choices are:

- a. Conduct Effects: How the Non-Compete Agreements affected compensation;
  - Periods when the illegal agreements were in effect;
- a. Persistence: How compensation effects linger over time;
  - Compensation in the previous two years;
- b. Worker Effects: How compensation would vary across workers, absent the agreements;
  - Age and gender of the worker;
  - Worker tenure;
  - Location differences;
- c. Industry Effects: How compensation would vary over time, absent the agreements;
  - Employment in the information sector in San Jose MSA (Metropolitan Statistical Area);
  - Defendant hiring;
- d. Employer Effects: How compensation would vary across firms, absent the agreement;
  - Firm revenue; and
  - Firm hiring.

## **B. Estimating Undercompensation**

20. The compensation model in my first Report explained total compensation of each employee divided by the CPI (to adjust for inflation).<sup>19</sup> This model

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<sup>18</sup> Leamer Report, paragraph 142

<sup>19</sup> Leamer Report, Figure 20, page 66. Compensation in that model was analyzed in logarithms to facilitate interpretation of percentage effects from the estimated coefficients.

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included a CONDUCT variable which took on a value of one in the years when a defendant had a Non-Compete Agreement, and zero otherwise.<sup>20</sup> In a model without dynamics to allow for persistence in compensation effects, the impact of the illegal agreements would be just the estimated coefficient on the CONDUCT variable,<sup>21</sup> which would measure the percentage by which total compensation was suppressed during the period in which the agreements were in place.

21. The intertemporal dynamics needed to explain compensation variability over time do not allow one to read the damages directly from the estimated equation because some of the CONDUCT effect carries over from year to year, and because the effect depends on other variables, for example, the age of the individual. In this setting, the estimated model needs to be run twice to estimate the damages. First, the model is run with the CONDUCT variable reflecting the existence of the Non-Compete Agreements at the times they occurred. Second, compensation is calculated with the CONDUCT variable turned off to reflect what compensation would have been had there been no Non-Compete Agreements. The difference in compensation between these two runs of the model is the estimated reduction in total compensation due to the agreements.

### **C. Individual Employee Data is Preferred for Estimating Undercompensation**

22. In my previous reports, I have analyzed the payroll records of the Defendants--depending on the issue at-hand--at the individual level, at the title level, and at the firm level.
23. For determining if these firms have “somewhat rigid” salary structures, I have argued that it is best to use title averages because the firm-wide effects are more evident in the title averages than in the individual data and also because the title structures are used by the firms to manage internal equity.

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<sup>20</sup> I set the variable to one-half for years in which a Defendant had a Non-Compete Agreement for only part of the year.

<sup>21</sup> The conduct effect varies by age and hiring rate. The variables have been defined so that the conduct coefficient on non-interacted conduct variable is interpreted as the effect on a 38 year-old at a firm with an average hiring rate.

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24. For purposes of estimating damages, a model based on individual-level data is the best choice, because individual data contain all the information in the data set, and because the statistical technique of regression properly applied can extract the relevant information from “noisy” individual data and because averages can be influenced by the changing composition of the workforces that comprise the averages. While individual workers are also changing over time, much of that change can be accounted for statistically with variables such as age and firm tenure.
25. Dr. Murphy raised issues regarding the estimation of the standard errors if the employees share common sources of variability that are not included in the model. Because, as I have previously shown, compensation levels of different individuals are correlated, e.g., within job titles, not every single individual can be viewed as an independent “experiment” for purposes of estimating standard errors.
26. On this point, it is important to reiterate, as expressed in my Reply Report, that none of my opinions is reliant on the standard errors.<sup>22</sup> My task is to determine the best possible estimate of the damages. A damage estimate with a large standard error will still be the best estimate, unless there is a more accurate alternative. While a large standard error means that the damages could be smaller, that same large standard error also means the damages could equally well be larger by the same amount. Absent a better estimate, we need to rely on the best we have. Dr. Murphy’s technical treatment of this problem, known as “clustered standard errors,” changes the standard errors but has no impact on the estimates of damages. Thus, the issue is irrelevant for the task of determining the best estimate once the model is decided upon.
27. I also explained in my Reply Report that the preferred treatment of this correlation problem is to include variables that capture the common sources of variation. This I have done by including firm revenues and San Jose Metro Area “information” employment in my model. But, as my previous work shows, common variation also results independent of these factors, as a consequence of

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<sup>22</sup> Leamer Reply Report, paragraph 77

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Defendants' maintenance of internal equity. Thus, Dr. Murphy's point about the standard errors has validity, but not relevance, since his adjustment to the standard errors has no impact on the damage estimates. In contrast to the "clustered standard errors" that Dr. Murphy has proposed, the inclusion of a revenue variable does affect the estimate of damages, and thus, is a material inclusion.

28. To confirm the point that Dr. Murphy's criticism has no impact on the damage estimates, I report below my analyses with and without the corrected standard errors per the preference of Dr. Murphy. The estimated coefficients will be exactly the same (and thus the damages computed will be exactly the same with or without the uncorrected standard errors).
29. An alternative approach to the problem of estimating standard errors of the damages is to build the damage estimates from annual averages of compensation for each defendant, instead of the individual data.<sup>23</sup> This is not a complete correction of the standard error problem since there may remain unexplained correlation among the firm average annual compensation levels, but averaging across employees within a firm is likely to eliminate most of the problem since it aggregates the correlated employees into a single observation. The use of annual averages, however, focuses attention on the intertemporal variability in the data set and away from individual heterogeneity measured by employee age, tenure, education, for example. An advantage of individual level data is that it allows for the possibility that changes in the composition of the Class may affect the total damages, a possibility that I suspect to be the case based on the analysis I have done previously of undercompensation with the individual data as well as the economic frameworks and evidence regarding focus of cold calling on somewhat more experienced workers.
30. Furthermore, using firm averages may help with the standard error issue, but it can create a new problem – the firm averages can change over time in part because the mix of employees is changing as some employees depart and some arrive. Thus, some of the variability in firm average compensation is not a

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<sup>23</sup> I reported an estimated model based on these annual averages in my Reply Report.

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symptom of a change in the compensation schedules but instead is a symptom of the changing mix of employees who comprise the average.

31. Thus, my approach will be to use the individual data with controls that are appropriate for firm success and external market forces. I will report this estimated model both with and without clustered standard errors, with the proviso that these do not affect my opinion.

## **V. Modifications to the Class Compensation Analysis**

32. There have been several changes since my October 2012 Report that affect my analysis. First, I have been asked to analyze undercompensation of the Class only. Second, since my October 2012 Report I received additional data regarding Lucasfilm and Pixar revenues.<sup>24</sup> Third, I have been asked by counsel to exclude certain titles from the Class.<sup>25</sup> Fourth, I have updated the conduct variable in my analysis to be consistent with the June 2007 start date in Figure 1 above. I estimate my compensation model below with these updates.

## **VI. Modifications Considered and Rejected**

33. I have considered and rejected the need for any modifications based on two additional issues (raised by counsel for Intel during my depositions): Intel's substantial employment of persons outside California and Intel's supposed status as principally a maker of hardware, rather than software. Neither of these issues has any bearing on the calculation of damages in this case or, for that matter, the likelihood of impact on all members of the Class.

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<sup>24</sup> At the time of my original Report several years of Lucasfilm and Pixar revenue data were unavailable to me. Pixar data were later provided with Dr. Murphy's Rebuttal Report and Lucasfilm data were produced by the defendant. This new data increases the number of observations that are usable in the analysis for these two Defendants, thus I have incorporated this data.

<sup>25</sup> Based on instructions from counsel I understand that a number of the job titles I included in the Technical Class in my original analyses are to be excluded from the class (e.g., because they involved Defendants' senior management). I have revised my data to flag those titles for exclusion from the analysis of the Technical Class.

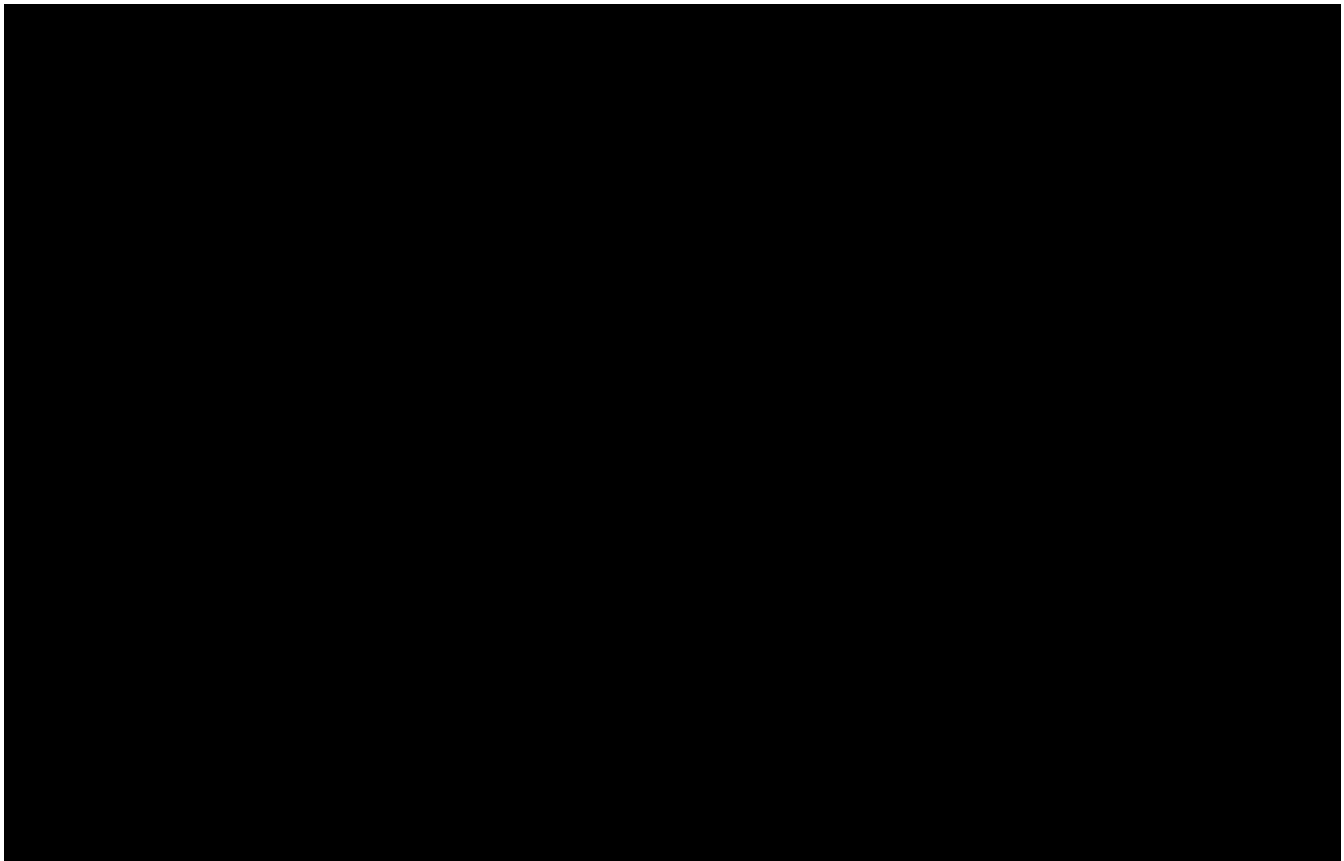
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**A. Class Members in California Are Not Substantially Different From Those in the Rest of the U.S.**

34. Figure 3 shows the fraction of the Class Members who were in California from 2001 to 2011. [REDACTED]



**Figure 3: Share of Defendants' Technical Employees in California (2001 – 2011)**



Note: Share of Defendant Employees in California, averaged over 2001-2011

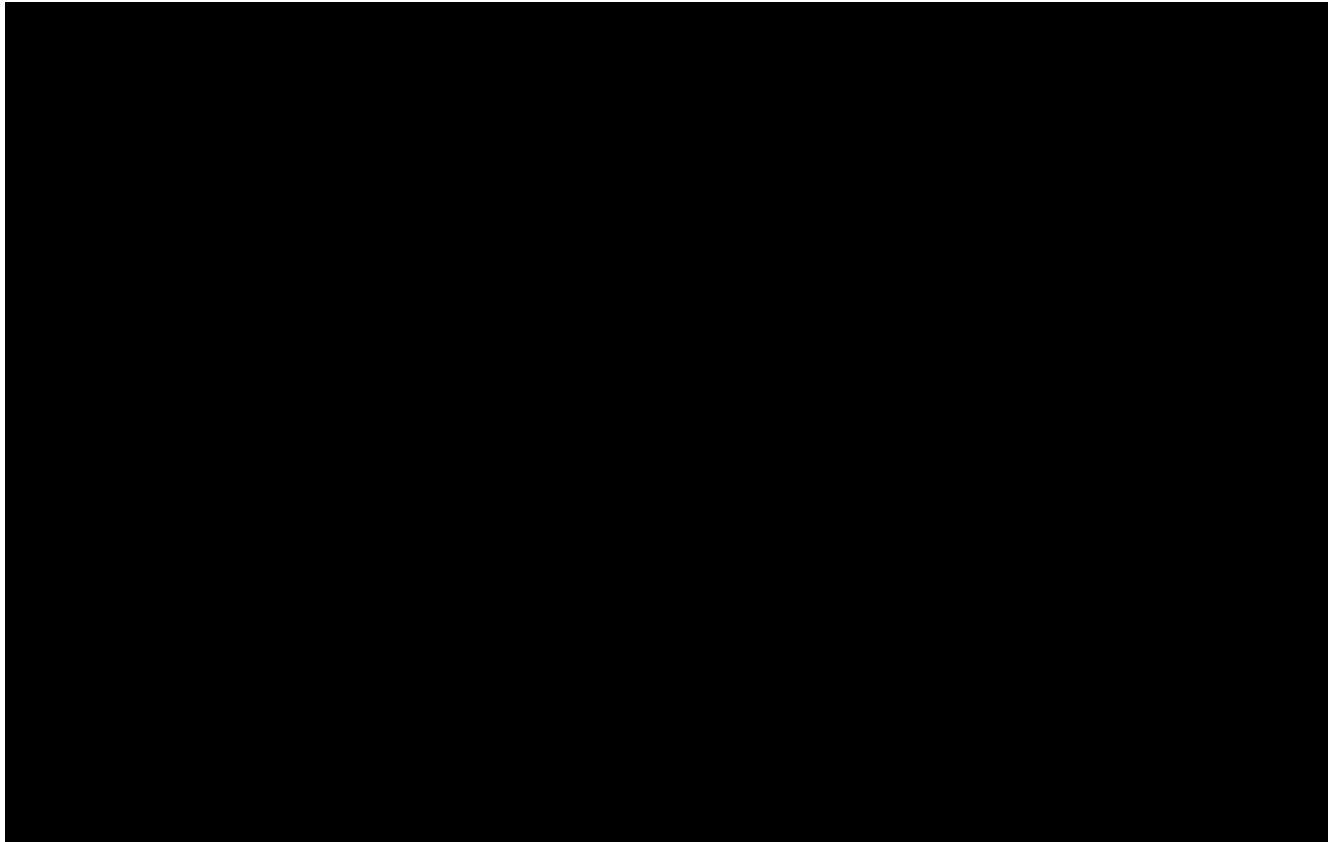
35. It has been posited that the California workforce compensation is importantly different from the rest of the U.S. My model has state-indicator variables and thus allows for compensation differences based on employee location, but the model does not distinguish the effect of the Non-Compete Agreements in California from the effect in the rest of the U.S. This concern is largely dispelled by the figure below which compares Intel compensation in California and in the rest of the U.S., and the concern is put to rest by a statistical analysis



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reported below that allows the CONDUCT effect to be different in California than the rest of the nation.

**Figure 4: Intel's Class Average Total Compensation by Region**



Note: Compensation has been inflation-adjusted using the CPI.

36. Figure 4 depicts Intel's average Class total real compensation for employees in California compared to those in other parts of the country. [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

As I describe below, I confirm the conclusion that this issue has no substantial effect on the estimation of damages by estimating a variation of my model that allows for differences in the impact of the Non-Compete Agreements depending on whether or not the employee was located in California.

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## **B. Intel Produces Software and Competes in the Same Labor Market as Other Defendants**

37. Intel sells computer hardware (microprocessors), not software like many of the other defendants, but, as I have commented previously, Intel has software engineers working to produce the code that drives their microprocessors.<sup>26</sup> Indeed, it is a commonly known fact that chip manufacturing is highly automated and relies on software engineers. Or, as Forbes put it, “Intel: The Biggest Software Company You’ve Never Heard Of.”<sup>27</sup> Also, in a recent article titled “Intel the Software Company - Aggressive Campaign to Poach Seattle's Software Engineers,” the authors’ subheading is “It doesn’t take many people to make chips these days because of highly automated fabs but Intel needs a lot of software engineers.”<sup>28</sup>
38. In any event, I present below in Exhibit 5 a variation of my compensation model using a hardware employment variable for Intel in addition to the San Jose Information Technology Employment variable. The regression results, and consequently the estimated damages, are not substantially affected.

## **VII. Estimation of Undercompensation and Calculation of Damages**

### **A. Undercompensation Estimation**

39. The analysis I conduct here and the regression damages model is substantially the same as the regression I conducted in my original report with the exception of the changes I described above. The variables I use are summarized in Figure 5. The regression allows the impact of the challenged conduct to vary by firm,

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<sup>26</sup> In my deposition on June 11, 2013, an attorney inquired about the suitability of the industry variable – the employment in the information sector in San Jose – for a study of Intel which is a manufacturer of microprocessors.

<sup>27</sup> Caulfield, Brian, “Intel: The Biggest Software Company You’ve Never Heard Of,” Forbes, May 9, 2012, <http://www.forbes.com/sites/briancaulfield/2012/05/09/intel-is-the-biggest-software-company-youve-never-heard-of/>

<sup>28</sup> Foremski, Tom, “Intel The Software Company – Aggressive Campaign To Poach Seattle’s Software Engineers,” Silicon Valley Watcher, June 17, 2013, [http://www.siliconvalleywatcher.com/mt/archives/2013/06/intel\\_the\\_software\\_co.php](http://www.siliconvalleywatcher.com/mt/archives/2013/06/intel_the_software_co.php)

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by year, and by the individual employee's age (as a proxy for their career experience).

**Figure 5: Data Definitions**

Variable (1)	Description (2)
1. Total Annual Compensation	Sum of annual base salary (as of December) plus bonuses, overtime amount, and equity compensation received in the year.
2. CPI	U.S. Consumer Price Index (St. Louis Federal Reserve).
3. Conduct	Indicator equal one in years where the Defendant had a Non-Compete Agreement, 1/2 in partial years at the start of the Agreements, 1/4 in 2009 and zero otherwise.
4. Age	Age of employee in years.
5. Number of New Hires in the Firm	Number of Class employees newly hired in the year.
6. Company Tenure	Number of months an employee has been affiliated with the Defendant.
7. Male	Indicator for male employees.
8. Location	U.S. State that an employees works in (as of December).
9. Information Sector Employment San Jose	Employment in San Jose/Santa Clara Valley in the information sector (St. Louis Federal Reserve).
10. National Hardware Engineer Employment	U.S. Employment in Computer Hardware Engineer Occupation Category (Bureau of Labor Statistics).
11. Total Number of Transfers among Defendants	Total number of Class employees who moved from one Defendant to another in the year.
12. Total Number of New Hires	Total number of Class employees hired by all Defendants in the year.
13. Firm Revenue Per Employee	Global revenue of the company divided by global employment in the company (SEC Filings and Defendant
14. Firm Profit Per Employee	Global net income of the company divided by global employment in the company (SEC Filings).
15. Firm Stock Price	Annual Average Adjusted Closing Price of Company Stock (Yahoo Finance).
40.	The detailed regression estimates are reported in Exhibit 2. In accordance with the discussion above, I also report a version of the regression estimated using clustered standard errors. (See Exhibit 3.) As I indicated in the discussion above, the coefficient estimates are precisely the same.
41.	To explore the robustness of these results to the addition of other variables, I have estimated a version of the model including Defendants' profits per

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employee in the previous year and also the level and rate of change of stock prices, all adjusted by the CPI. The profits in the previous year refer to a cash flow of the firm that could be shared with the workforce via increases in compensation. High and/or rising stock prices, controlling for profits, reflect healthy expected future cash flows which may encourage firms to reward their workforce and may make it more attractive to use equity grants and options as a form of compensation. Pixar and Lucasfilm were not publicly traded, so they are excluded from this analysis. I estimate a modified version of my model with these variables below. (See Exhibit 4.) When I calculate undercompensation with this model for the five Defendants that can be included, I find that this model actually finds slightly greater undercompensation than the model that included all seven Defendants but not the stock price and profit variables. Because this model with these additional variables is unable to incorporate all Defendants, I maintain the earlier model as the more conservative, complete estimate.

42. As noted above, although Intel is less of a hardware engineering firm than generally perceived, I also estimated a variation of my model that has been modified to utilize a U.S. computer hardware employment variable for Intel in addition to the Information Sector variable (which I continue to utilize for the other Defendants). (See Exhibit 5.) The estimated model suggests that Intel is more sensitive to the San Jose information employment than the other firms, not less, and Intel has compensation that is actually suppressed when the national hardware engineer employment is growing. In addition, the overall fit of the model is hardly budged by this amendment. Thus, there is no support in these data for the hypothesis that Intel is hiring mostly hardware engineers, and I therefore use my updated original model for a damage calculation.
43. As I also described above, most Defendants had two-thirds or more of their employees in California, but Intel had seventy percent of employees outside California. This difference might be important if the employees outside of California were treated differently from employees inside California. The models that I have estimated at the individual level have all included state indicator variables, which allow for fixed differences between California and the rest of the country, for example, a cost of living adjustment. A new model

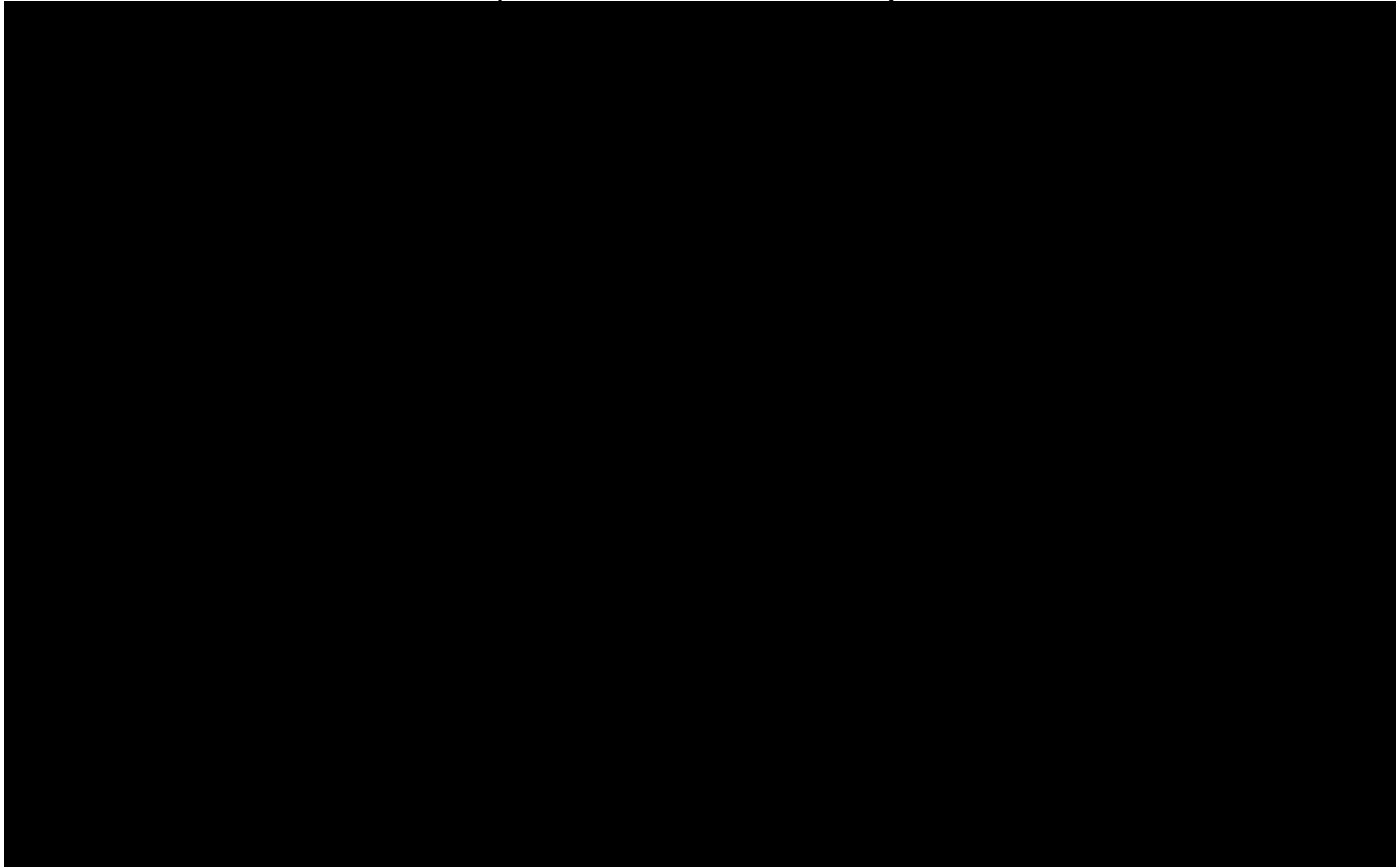
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reported in Exhibit 6 also allows for the possibility that the impact of the anti-cold-calling agreements was different inside of California. The addition of the interaction between CONDUCT and a California indicator does not substantially affect model performance or the estimated conduct effects relative to my compensation model reported in Exhibit 2 (and Exhibit 3).

44. Using the estimation results from Exhibit 2, I compute compensation from the model, but “turning off” the CONDUCT variable. This has the effect of calculating the compensation that Class employees would have received but-for the Non-Compete Agreements. The regression allows the undercompensation to Defendants’ workforces to vary by firm and by year, just as in my prior analysis.
45. Figure 6 compares the actual average total compensation of all employees of the seven defendants, with the estimated compensation but-for the Non-Compete Agreements. As may be noted in the figure, the undercompensation effects continue beyond the end of the conduct (indeed, beyond the Class Period). This is the result of the high persistence which my model allows for and estimates. Thus, although the conduct is assumed to have ended in March 2009, the damages are calculated to the end of the Class Period in December 2009.

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**Figure 6: The Impact of the Non-Compete Agreements: Actual Average Total Compensation vs. But-For Compensation**



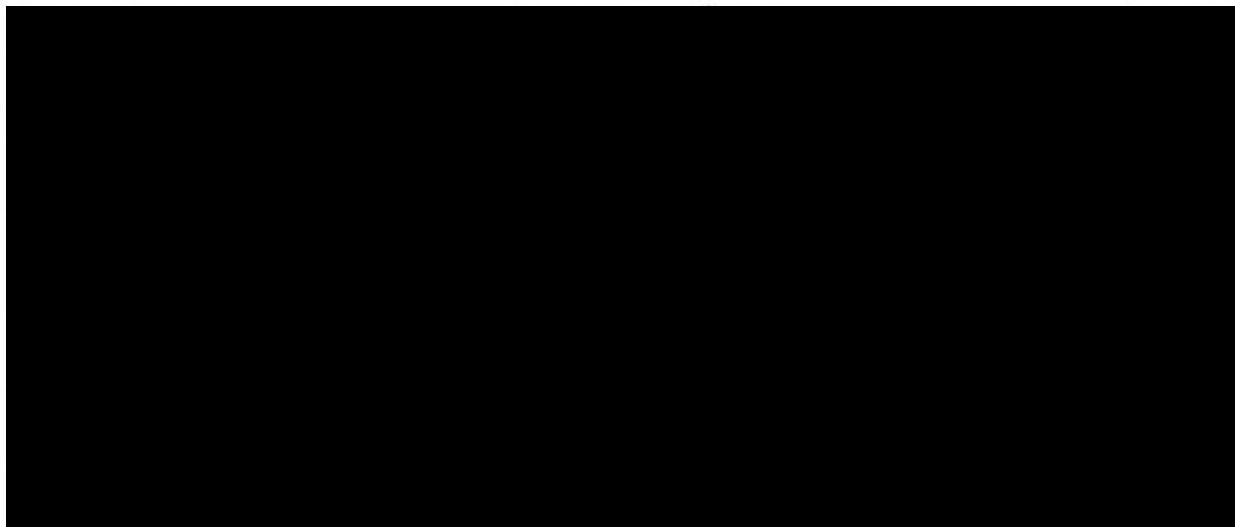
Note: Undercompensation Percentages depicted for Class Period Compensation

46. The estimates of total but-for compensation by year are reported in the third column of Figure 7. Comparing this compensation during the Class Period to the actual compensation received in column two, I estimate the Class was undercompensated by [REDACTED]

[REDACTED]

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**Figure 7: Damages**



Source: Defendants' employee compensation data; Conduct Regression Results.

A handwritten signature in cursive script, appearing to read 'E. E. Leamer'.

Edward E. Leamer, Ph.D.

October 28, 2013

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**Exhibit 1**  
**List of Materials Relied Upon**

**Pleadings and Orders****Date**

Order Granting Plaintiffs' Supplemental Motion for Class Certification

10/24/13

**Depositions and Exhibits****Date**

Leamer, Edward Vol. 2

06/11/13

Murphy, Kevin Vol. 2

07/05/13

**Expert Reports**

Expert Report of Edward E. Leamer

10/01/12

Reply Expert Report of Edward E. Leamer

12/10/12

Supplemental Expert Report of Edward E. Leamer

05/10/13

Rebuttal Supplemental Expert Report of Edward E. Leamer

07/12/13

Expert Witness Report of Kevin Hallock

05/10/13

**Publicly Available Materials**

Bureau of Labor Statistics, "Occupational Employment Statistics - Computer Hardware Engineers"

Caulfield, Brian, "Intel: The Biggest Software Company You've Never Heard Of," Forbes, May 9, 2012,

<http://www.forbes.com/sites/briancaulfield/2012/05/09/intel-is-the-biggest-software-company-youve-never-heard-of/>

Foremski, Tom, "Intel The Software Company – Aggressive Campaign To Poach Seattle's Software Engineers," Silicon Valley Watcher, June 17, 2013,

[http://www.siliconvalleywatcher.com/mt/archives/2013/06/intel\\_the\\_software\\_co.php](http://www.siliconvalleywatcher.com/mt/archives/2013/06/intel_the_software_co.php)

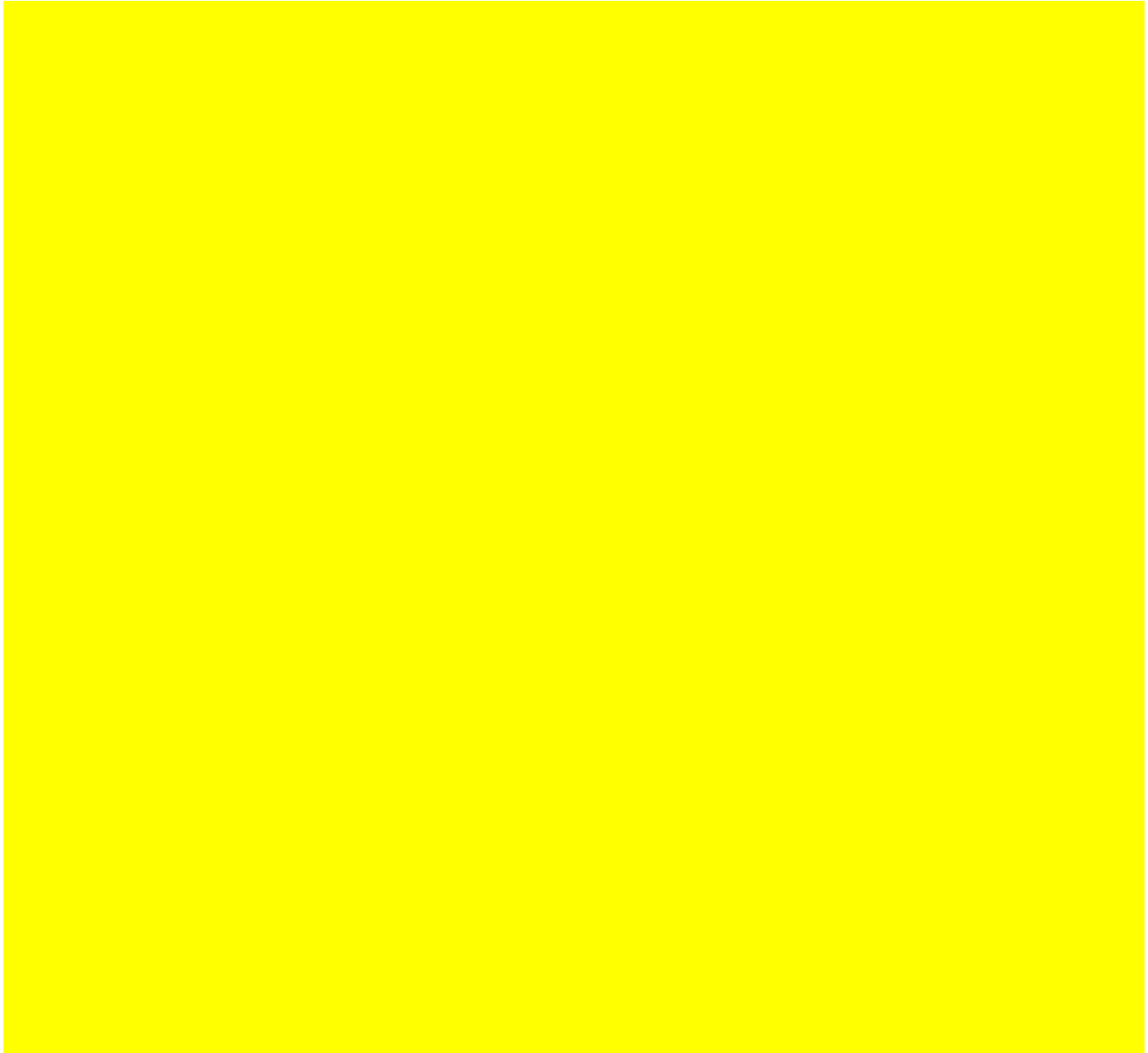


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## Exhibit 2: Compensation Model

**Observation:** Employee ID record in December of each year

**Dependant Variable:**  $\text{Log}(\text{Total Annual Compensation}/\text{CPI})$



- Note: (1) \*\*\* Significant at 1% level; \*\* Significant at 5% level; \* Significant at 10% level.
- (2) Total Annual Compensation is computed as sum of base annual compensation (in December), overtime pay, bonus, and value of equity compensation granted.
- (3) Value of equity compensation is computed using the weighted average grant-date fair values for stock options and restricted stock units from SEC Filings.
- (4) Firm Revenue Per Employee is computed as a ratio of global revenue to global number of employees, both obtained from SEC Filings. Lucasfilm and Pixar revenues obtained from defendant documents.
- (5) Observations are restricted to cases in which there was no change in employer in the previous two years.

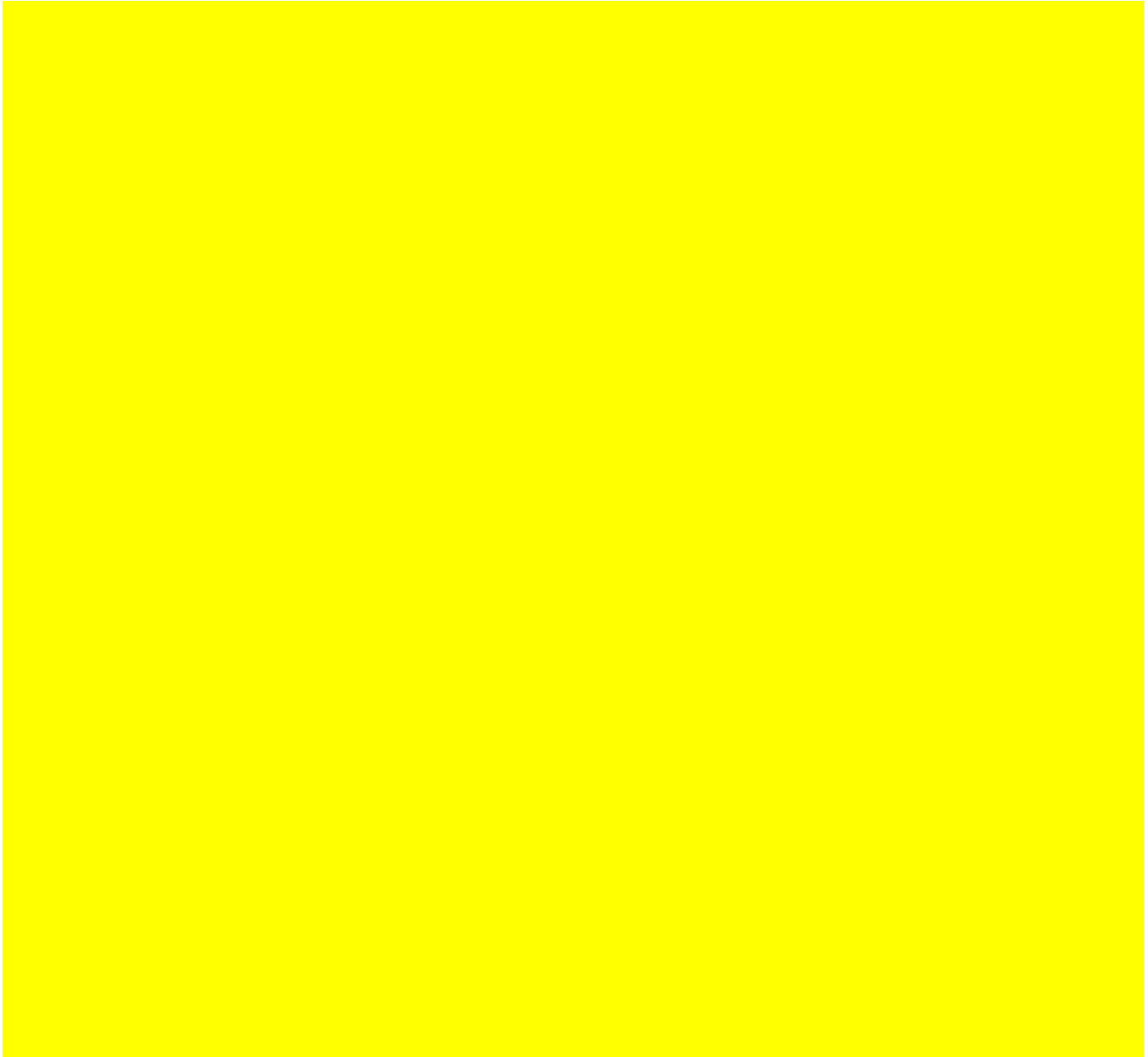
Source: Defendants' employee compensation data; St. Louis Fed Reserve; SEC Filings

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### Exhibit 3: Compensation Model with Clustered Standard Errors

**Observation:** Employee ID record in December of each year

**Dependant Variable:**  $\text{Log}(\text{Total Annual Compensation}/\text{CPI})$



- Note: (1) \*\*\* Significant at 1% level; \*\* Significant at 5% level; \* Significant at 10% level.
- (2) Total Annual Compensation is computed as sum of base annual compensation (in December), overtime pay, bonus, and value of equity compensation granted.
- (3) Value of equity compensation is computed using the weighted average grant-date fair values for stock options and restricted stock units from SEC Filings.
- (4) Firm Revenue Per Employee is computed as a ratio of global revenue to global number of employees, both obtained from SEC Filings. Lucasfilm and Pixar revenues obtained from defendant documents.
- (5) Observations are restricted to cases in which there was no change in employer in the previous two years.
- (6) Standard Errors adjusted for clustering at employer-year level.

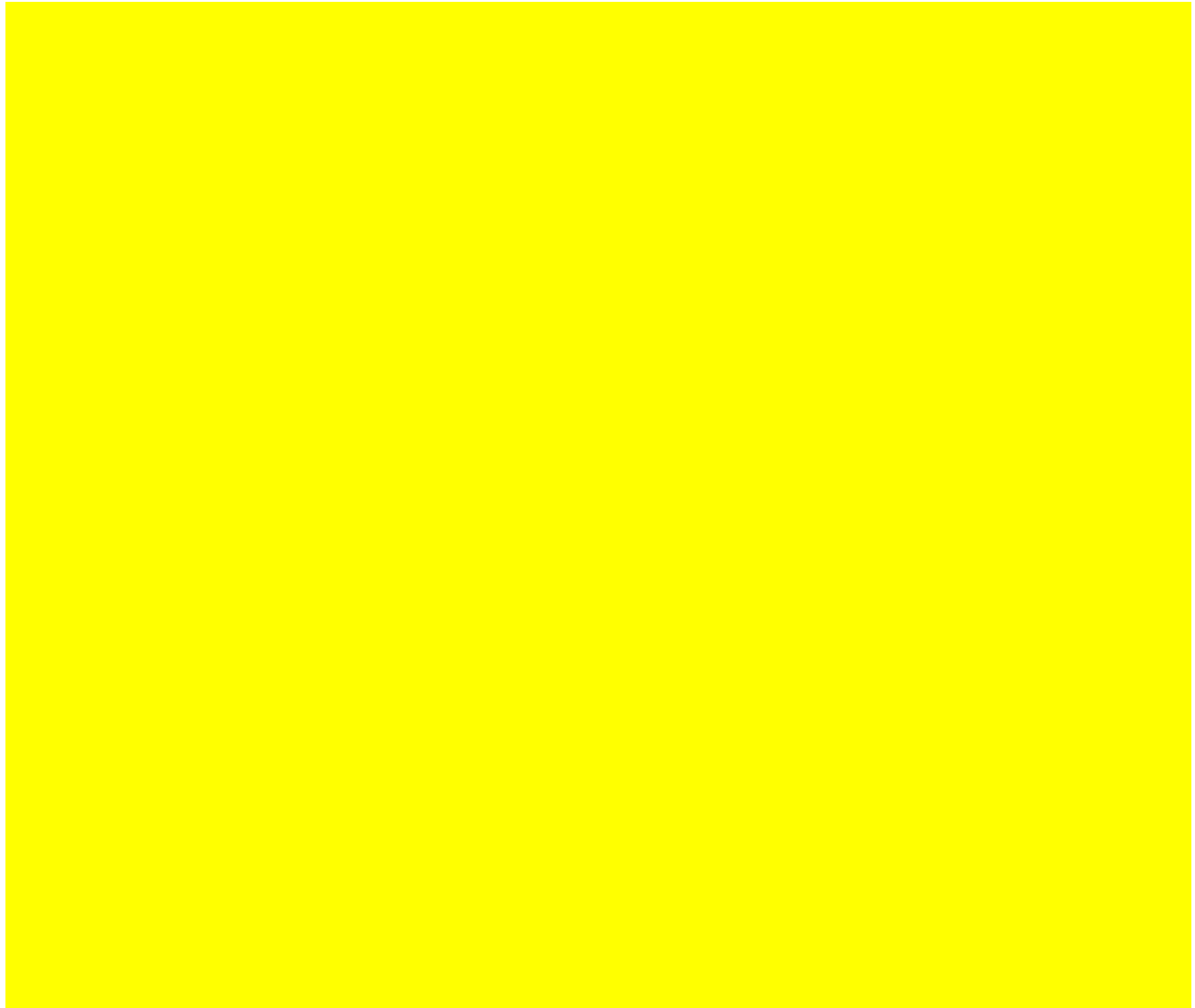
Source: Defendants' employee compensation data; St. Louis Fed Reserve; SEC Filings

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#### Exhibit 4: Compensation Model with Added Variables

**Observation:** Employee ID record in December of each year

**Dependant Variable:**  $\text{Log}(\text{Total Annual Compensation}/\text{CPI})$



- Note: (1) \*\*\* Significant at 1% level; \*\* Significant at 5% level; \* Significant at 10% level.
- (2) Total Annual Compensation is computed as sum of base annual compensation (in December), overtime pay, bonus, and value of equity compensation granted.
- (3) Value of equity compensation is computed using the weighted average grant-date fair values for stock options and restricted stock units from SEC Filings.
- (4) Firm Revenue Per Employee is computed as a ratio of global revenue to global number of employees, both obtained from SEC Filings.
- (5) Firm Profit Per Employee is computed as a ratio of global net income to global number of employees, both obtained from SEC Filings.
- (6) Firm Stock Prices obtained From Yahoo Finance
- (7) Observations are restricted to cases in which there was no change in employer in the previous two years.
- (8) Lucasfilm and Pixar omitted due to lack of data.
- (9) Standard Errors adjusted for clustering at employer-year level.

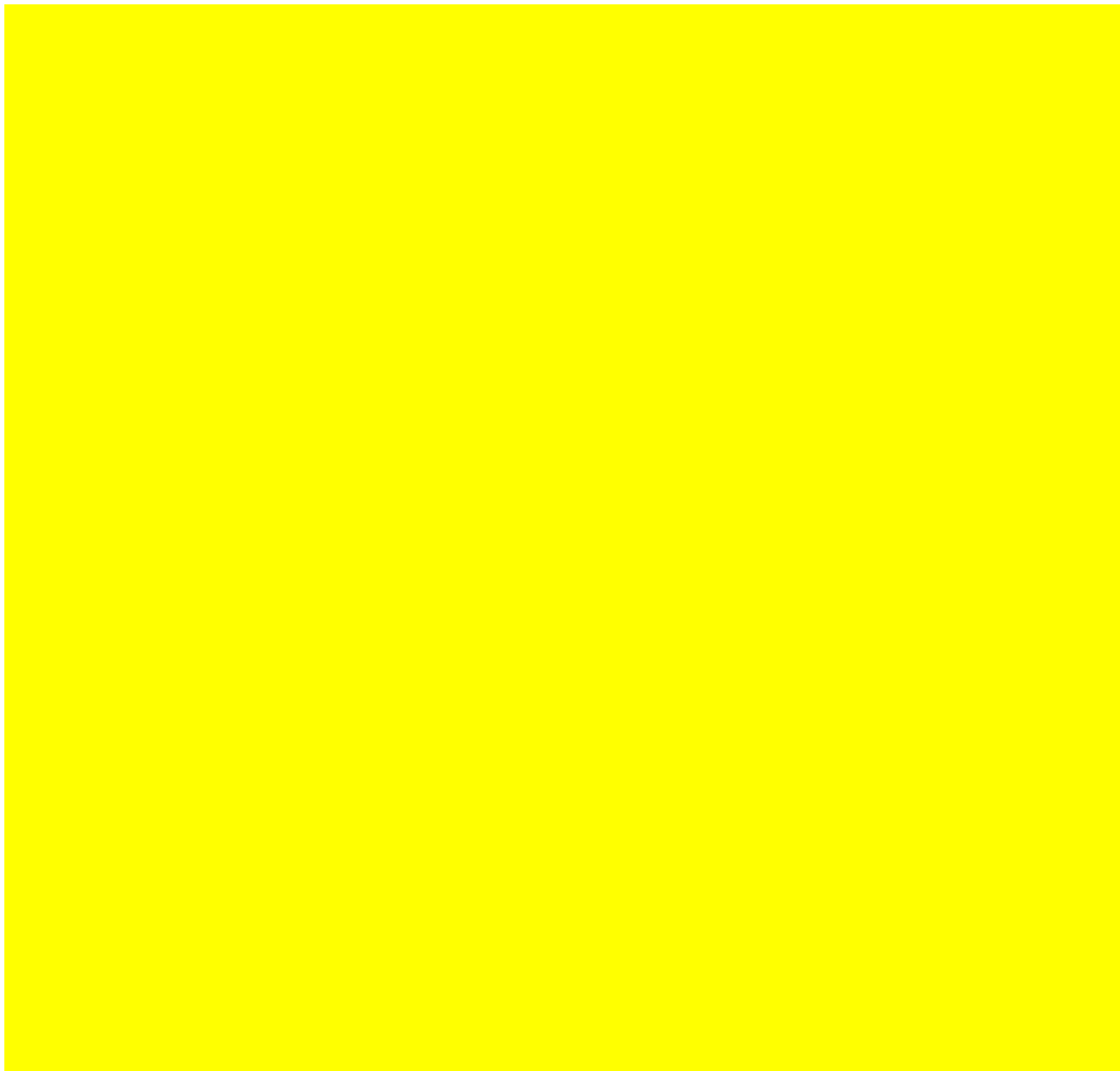
Source: Defendants' employee compensation data; St. Louis Fed Reserve; SEC Filings

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### **Exhibit 5: Compensation Model with Hardware Employment Variable**

**Observation:** Employee ID record in December of each year

**Dependant Variable:**  $\text{Log}(\text{Total Annual Compensation}/\text{CPI})$



Note: (1) \*\*\* Significant at 1% level; \*\* Significant at 5% level; \* Significant at 10% level.

(2) Total Annual Compensation is computed as sum of base annual compensation (in December), overtime pay, bonus, and value of equity compensation granted.

(3) Value of equity compensation is computed using the weighted average grant-date fair values for stock options and restricted stock units from SEC Filings.

(4) Firm Revenue Per Employee is computed as a ratio of global revenue to global number of employees, both obtained from SEC Filings. Lucasfilm and Pixar revenues obtained from defendant documents.

(5) Observations are restricted to cases in which there was no change in employer in the previous two years.

(6) National Employment Statistics for Computer Hardware Engineer Occupation Category from BLS.

(7) Standard Errors adjusted for clustering at employer-year level.

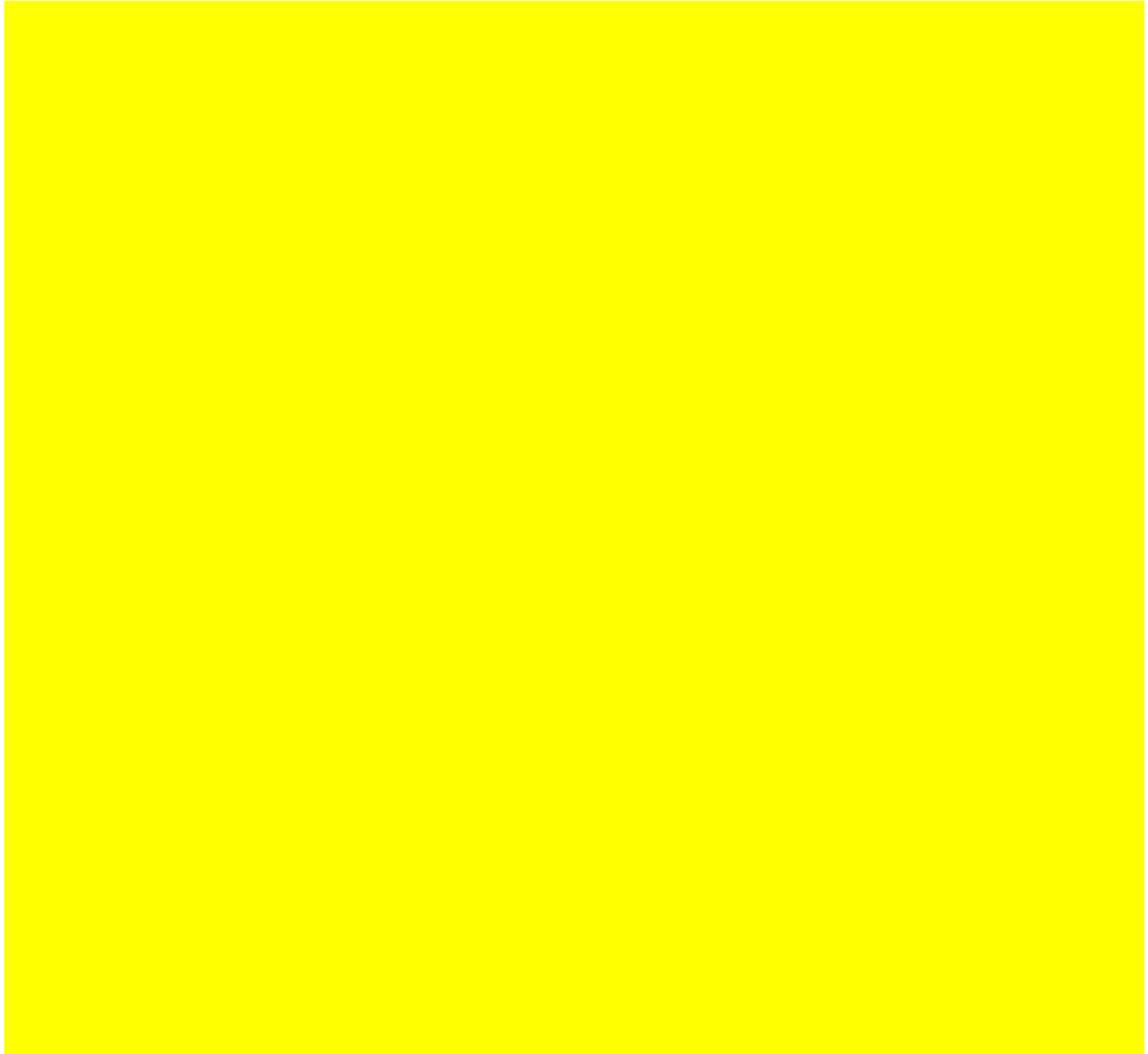
Source: Defendants' employee compensation data; St. Louis Fed Reserve; SEC Filings

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### **Exhibit 6: Compensation Model with Geographic Control Variable**

**Observation:** Employee ID record in December of each year

**Dependant Variable:**  $\text{Log}(\text{Total Annual Compensation}/\text{CPI})$



Note: (1) \*\*\* Significant at 1% level; \*\* Significant at 5% level; \* Significant at 10% level.

(2) Total Annual Compensation is computed as sum of base annual compensation (in December), overtime pay, bonus, and value of equity compensation granted.

(3) Value of equity compensation is computed using the weighted average grant-date fair values for stock options and restricted stock units from SEC Filings.

(4) Firm Revenue Per Employee is computed as a ratio of global revenue to global number of employees, both obtained from SEC Filings. Lucasfilm and Pixar revenues obtained from defendant documents.

(5) Observations are restricted to cases in which there was no change in employer in the previous two years.

(6) Standard Errors adjusted for clustering at employer-year level.

Source: Defendants' employee compensation data; St. Louis Fed Reserve; SEC Filings